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THE RATIONAL METHOD

—OF—

PREVENTING YELLOW FEVER

—ON—

THE SOUTH ATLANTIC COAST.

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The Rational Method of Preventing Yellow Fever Epidemics on the South Atlantic Coast.

While the efforts of the public press and the great mass of the medical profession, have of late years succeeded in directing the attention of the Southern people exclusively to quarantine, as a means of protecting themselves from the ravages of yellow fever, the occurrence of many epidemics within our borders, in the last twenty years, has led me to inquire whether the facts of history warrant the confidence which we are asked to repose in this one measure.

I find that Boston was the first city upon our coast to establish quarantine 1648. (See Records of Governor of Massachusetts, in *New England Journal*, vol. 2, p. 237.)

In 1722, vessels from France, and other places infected with the plague, were to perform quarantine for at least forty days. Non-performance was accounted a felony, and punishable by death. Rigid quarantine of detention was enforced until the first years of this century. There occurred four epidemics of yellow fever during this period, viz.: 1693, 1798, 1802 and 1805.

Philadelphia established quarantine for the protection of her citizens from yellow fever early in the last century. In 1728 the first ships were detained at the quarantine station (Third National Quarantine and Sanitary Convention, New York, 1859, p. 278). From that time on the practice was kept up and the regulations were rigidly enforced, especially after the severe epidemics of 1793 and until 1818, when it was modified (*American Journal*, vol. 1, pp. 169, 170.) During this period Philadelphia was infected in 1741, 1744, 1747, 1762, 1793, 1794, 1797, 1798, 1799, 1802, 1803, 1805; and after its modification in 1820 and 1853.

New York had quarantine laws as early as 1758, and the laws after the year 1784 were as strict, in point of severity, as those of European countries against the plague, with a detention of thirty days or longer, from May until November, and were maintained more or less rigidly until 1857, when the present sanitary system was established. Under the rigid plan it was infected in 1791, 1795, 1796, 1798, 1799, 1803, 1804, 1807, 1809, 1819, 1821, 1822, 1823, 1848, 1855, 1857.

In relation to these measures of protection, Dr. Miller of New York, wrote in 1805: "The experience of quarantine in the United States speaks little in its favor, for although during the last ten years it has been scrupulously enforced in several ports, we have heard ten times more of imported contagion and its ravages at these very ports during that period, than for a hundred years before when no quarantine was in existence." (*Vide* pp. 115, 116.)

Vessels were required to quarantine at Bedlow's Island, and all communication was interdicted with vessels, cargoes, passengers and crew arriving from foreign ports suspected of contagion—heavy penalties and imprisonment were inflicted for non-performance.

Providence, R. I., Baltimore, Md., Norfolk and Wilmington, under quarantine regulations suffered from yellow fever infection—the first during four years, the second seven years, the third ten years, the fourth six years.

From this brief resume it is evident that Northern ports have not been protected from yellow fever, but have suffered from its visitations as frequently as we do now at the South, under strict quarantine of detention.

I will now direct my attention to Southern ports, and endeavor to find out what quarantine has accomplished for them.

New Orleans: The Legislature of Louisiana, in 1817, passed a quarantine law which went immediately into operation. Yet, notwithstanding, in 1818 cases of fever occurred in pretty large numbers, forty three being admitted into the Charity Hospital. In consequence of this the Legislature repealed the quarantine the following winter, (Dowler, pp. 24, 25); but the fever having appeared epidemically in 1819 and 1820, the Legislature re-enacted in 1822, a code of quarantine regulations. The following season was exempt, but in 1824 the disease, setting at defiance all restrictive measures, prevailed extensively. "Indeed, it has been found in that city, that the appearance and prevalance of the fever are not influenced by the quarantine laws. It

has prevailed when those laws existed and when they were rigidly enforced. It prevailed even during the war of 1812, when from want of arrivals no quarantine could be required, and it has failed to prevail at periods when no restriction was placed on the intercourse with infected places in the West Indies and elsewhere," and even now that they possess the best system of maritime quarantine in this country, secured to them by the energy of Dr. Joseph Holt. Who is he that believes New Orleans to be protected? when Dr. Holt himself writes, on November 6th, 1888: "Quarantine as we may! declare non-intercourse with the world! build around ourselves a wall without gates if we will! until the city is provided with a superficial and subsoil drain, and its sewage disposed of through some efficient system, we live in JEOPARDY; yea, in the certainty DISASTER."

Charleston: Quarantine was early established and carried out with great rigor at times. Dr. Tucker Harris, of that city, says, speaking of the years 1793, 1798 and 1803, when yellow fever prevailed in the epidemic form: "It will be in vain to pretend that a more strict attention could be paid to quarantine order." Dr. L. Dawson, health officer from 1848 to 1868, writes in his letter to me, that, from 1821 to 1858, quarantine was, at times, rigidly enforced, at others almost nominal, and although the commercial relations between the city and the West Indies steadily increased, we find no difference whatever in the mortuary records—few years having passed without having yellow fever occurring, either in the sporadic or epidemic form; and that in his official career he has observed that quarantine did not affect the outbreaks of yellow fever one way or the other. Dr. R. Lebby, who succeeded him as health officer, expresses himself in similar language as to the efficiency of quarantine *per se*, and the records plainly show that Charleston has not been much benefited by quarantine since she has suffered from forty-four visitations of yellow fever.

Almost every city and town along our coast has had its epidemics of yellow fever, and has established quarantine measures at some time or other to prevent their recurrence. Savannah was infected during four years; Mobile, fifteen years; Pensacola, twenty-two years; Galveston, nine years; but the scope of this paper prevents me from giving more details. I have selected those cities only which, from their importance, and the number of times which they suffered from the dread visitant, have been most carefully and for the longest time subjected to quarantine, believing that it would furnish the best subject upon which to study its effects as a protective measure.

Some of these cities are situated north of the latitude which we

are now taught to believe are peculiarly liable to yellow fever? But if they suffered from epidemics in the past, as much as our Southern cities do now, and if, as history proves, quarantine was enforced, while they were liable, and failed to protect them, to what do they now owe their immunity? If we discover the means by which they have saved themselves, may we not hope by following their example to work similar results at home? Perhaps we may find an answer to these questions by glancing at the nature of yellow fever. Unlike contagious diseases, which are conveyed by mediate or immediate contact to all persons in any situation within their influence—in all climates, at all seasons of the year, but similar to malarial fevers, in being confined to certain climates, certain localities and certain seasons—it still differs from the latter in this: Endemic autumnal fevers, when assuming the epidemic form, pervade a wide extent of country. They do not spread from a focus, but the malaria rises, *ab initio*, from the whole of the marshy soil, and does not spare contiguous elevated spots, unless protected by buildings or trees. Epidemic yellow fever starts at some point around which it spreads, then makes its appearance perhaps at some other point, or points, without necessarily affecting the intermediate territory, though there may be no special object in the way.

In support of this proposition, I quote from Dr. Laroche's great work on Yellow Fever, vol. 2, page 325: "In Philadelphia the disease has, during its various visitations, exhibited in a most striking manner this inability to diffuse itself afar. In 1699 the fever which commenced at the wharf, between Market and the draw bridge, extended over the infant city, but does not appear to have gone much, if at all, beyond its precincts. In 1717 it was mostly confined to the southern part of the city, between the draw bridge and the neighboring dock, then uncovered. In the memorable epidemic of 1793 the disease, after commencing on Water Street, spread gradually over the then small city, as also in Southwark and Kensington, but not farther. In 1794 its limits were circumscribed to localities contiguous to the river. In 1797 it raged in the districts of Southwark and Kensington. In 1798 again it spread more or less over the whole city and some of the surburbs. In 1799 the epidemic spread from Penn Street on the wharf to 7th Street; beyond these few cases occured. In 1802 it extended particularly in Front and Water Streets, near the draw bridge. Next year it prevailed in Water Street, scarcely reaching Second Street. Breaking out in 1805 in the district of Southwark, the infection extended to a small section of the Southern extremity of the city. In 1819 it was strictly limited to two points: The north side of Market Street wharf and in Front Street, above Walnut. In 1820 the

fever, though appearing in several localities parallel with the river Delaware, did not reach the east side of Second Street. In 1853 it broke out at the corner of South Street and the wharf, occupying an area of two or three squares to the north and south, and one-third of that distance west. The fever also broke out, to a very limited extent in the northern liberties, leaving the intermediate space and all north of Spruce Street free and healthy.

"That cases occurred beyond the limits ascribed to the disease during the several epidemics mentioned is certainly true, but in the very large majority of these, if not all, *they were in persons who had imbibed the seeds of the infection in the sickly districts.*"

It will be seen by the above that the starting point of all these epidemics in Philadelphia was the low, damp and filthy localities bordering the river and near the wharves and docks.

In New York, we find that the disease was limited to Peck Slip and the neighboring streets in 1791 (Addows, p. 7), principally in Water Street, whence it spread over the then small city. In 1795 it did not advance beyond the wharves and vicinity (Bayley, pp. 60 and 90). In 1800 it was limited to Pearl Street, Water Street, and the adjoining slips (Seaman 4, p. 250). In 1803 it arose in Coffee House Slip, and extended near the margin of the two rivers (Hardin p. 13). In 1805 in Front and Pearl streets below Burling Slip. It then broke out near the North River and prevailed mostly on the low grounds situated on the margin of the two streams (Miller, p. 89). The fever of 1819 began at the foot of Pier No 8, East River, thence running on the eastern side of the same pier and the adjoining slip to the corner of Pearl, up Pearl to the west side of Wall, down Wall to East River—thus including little more than the old slip and the parts adjacent (Watts, pp. 302 and 350). In the epidemic of 1822, one of the most severe that New York suffered from, the disease commenced in Rector Street, and gradually spread in every direction, but did not extend beyond Fulton, which runs parallel with the other at a distance of eighteen hundred feet (Proceedings of the Board of Health, p. 196). The disease occurred also in the parallel streets of Cheapside, Lombardy and Banker, situated at a distance of about three-fourths of a mile from Fulton Street, and extending a distance of three streets, or eight hundred to one thousand feet, but it made comparatively little progress in that region and was more circumscribed than in the lower districts (*Ibid*). Here, also, the origin and spread of epidemics occurred in damp and filthy and badly drained localities.

In Baltimore, all the epidemics since 1793 have prevailed periodically at Fell's Point, a kind of low suburb on the margin of the water. (Davidge, p. 66.)

The fever which prevailed in Boston in 1798 did not extend beyond the town dock, State Street, Liberty square, around Fort Hill and the surrounding parts. In 1802 it again broke out in the vicinity of Fort Hill, but its sphere of action was still more circumscribed. In 1819 it again prevailed in the same locality, but only to the southeast side of the fort (New England Journal 8, p. 380.)

In Providence, 1797, 1800 and 1805, the epidemic fever was confined to the south part of Water Street, the lanes and alleys immediately adjacent (Med. Rep. 10, p. 40.)

On the Continent of Europe the same peculiarity of localization has been observed by writers—in Barcelona, Cadiz, Seville, Malaga and other cities of Spain (Edin. Med. and Surg'y Journal 35, p. 272); also, in Leghorn and Gibraltar in 1804 (Palloni, p. 33.)

In Savannah, although in 1820, 1854 and 1876, the epidemic area of yellow fever extended over the whole city, the surrounding country remained free from its influence. The original focus of these epidemics has been in filthy localities, badly drained, near sobby lands.

The above facts not only indicate that there must exist some local cause for the origin and spread of the disease, but also serves as incontrovertible evidence against any contagious property in the disease, for contagion is never confined in its progress.

The condition of New Orleans, which has suffered a greater mortality from yellow fever than any other city in the world, is thus graphically described by Dr. Barton, in a most valuable report, written after the severe epidemic of 1853: He speaks of "the filthiness of the streets, privies and backyards as a matter of common observation by the public, and of complaint in the newspapers; the gutters, often twelve hours after a rain, bubbling up a gas through dirty water. The large number of unfilled lots and unpaved streets in various parts of the city, exposing filth of all kinds and stagnant, putrid water. The large open drains, in and near the city, filled with the refuse of the districts. The interments within the city, in six cemeteries—the receptacle of thousands of bodies, buried above the ground to lend their important aid in corrupting the air. The numerous slaughter-houses, large vacheries and livery stables, with their

offensive and polluting exhalations. The crowded, filthy and unventilated dwellings, in low, damp situations—many in half-drained, unpaved lots and courts, with filthy, stagnant water under the floors. The exposure of the naked bank of the river for about six miles, many parts of it made a common receptacle of, and reeking with garbage and filth of all kinds, exposed to the sun and rain, without a single police officer to prevent its being made a common deposit for these nuisances, or covering or throwing them into the river. The upturning and exposure of the original soil over large areas in and about the city, for clearing out ditches and digging canals and making new basins, exposure of sub-soil and water for laying water and gas pipes, in making new streets and levees."

He also describes the interminable swamps which surround the city, exposed to inundation by overflow of the river, and to dessication by the rays of the sun, which raise the heat to 130° and 140° F. after the subsidence of the water.

This state of things not only existed at the time it was described by Dr. Barton, but was the permanent result of the natural situation of the city (built on a bed of alluvium, below high-water mark) and of the persistent neglect on the part of the municipal authorities from the time of its settlement. So it is, that from 1797 we find yellow fever to be almost an endemic disease there. But, although this was the case, and although the whole city was in a bad sanitary condition, here again we find that the epidemics always started in, and sometimes were almost confined to those localities which were peculiarly damp and filthy, as along the levees and the dirtiest and most crowded streets. The description given by the Auxiliary Sanitary Association, in 1879, was perhaps even worse than that of Dr. Barton in 1853, and seems fully to justify the opinion of travelers: "That, next to Constantinople, New Orleans is the filthiest city in the world"; and the exclamation so recently uttered by Dr. Joseph Holt: "New Orleans to be saved must be drained and cleaned!"

In the city of Charleston, S. C., which is situated on a low lying peninsula between the Ashley and Cooper rivers, little facilities are offered for drainage, and the sanitation of the town was so bad that until recent years buzzards were the principal scavengers around the market. The garbage, in all its filthiness, was used as a foundation in reclaiming the marshy lands for building and other purposes. Prof. Dickson remarks "that the cause of yellow fever, although it may consist of many combined influences, is in perpetual existence in the summer atmosphere of Charleston. It is common," he says, "to talk

of intervals between the several incursions of yellow fever. For myself, I am fully satisfied that there are no such intervals, and believe that no single summer passes over the inhabitants of that city without offering cases of greater or less intensity."

Hewett, in his History of South Carolina, informs us that while the fever raged in Charleston (in the year 1792) the worthy Governor held his headquarters about a half mile distant from the town, not wishing to expose his men to the dangerous infection unless from necessity. Here again we find that feature of localization so strikingly prominent in the manifestations of yellow fever in Northern cities, as if the disease loved the home of its birth or adoption, or was prevented from leaving it by want of sustenance in the cleaner soil and purer air surrounding the spot.

Of all the cities along the coast that have suffered from the yellow fever, Savannah has had the fewest epidemics, except perhaps St. Augustine. It is so situated on a high bluff, 45 feet above the river, with a light, sandy, porous soil, which is kept comparatively free from moisture and soluble filth by percolation. Here the epidemics have always had their origin in localities contiguous to the low marshy lands on flanks, and where are situated the dirtiest and smallest houses, with the narrowest streets and the most careless and ignorant population. The influence of these lowlands and morasses upon the general health of the city, by producing malarial fevers, was very great at the beginning of this century, when they were cultivated in rice under the wet system. In Dr. Daniell's "Autumnal Fevers," published in 1826, pp. 31–32, he says: "I find that the mortality in 1815, 1816 and 1817 was one in every 11 inhabitants. In 1818, when a system of dry culture was established, and these lands were kept dry, the mortality dropped to one in 62½. In 1819 a partial epidemic of fever (yellow?) occurred among the foreign laborers who had flocked to the place, increasing the death rate to one in 13, although among the permanent population it was only one in 34. In 1820 an epidemic prevailed with the remarkable mortality of one in 5.1 inhabitants." Among the causes to which this epidemic is ascribed by him were the following: "Neglect in drainage of dry culture lands; want of attention to the cleanliness of the city; the introduction of a large number of a laboring class of whites; the great fire of 1820, which caused large accumulations of rubbish on the streets, and exposed open privy vaults, with their contents covered with putrid water, to the sun, and which moreover crowded the new population into the small houses of the filthy suburbs, where the fever first made its appearance."

From far back in the history of yellow fever, writers have ascribed to atmospheric humidity a large share of agency in the production of the disease, and have considered it, when combined with excessive and long continued heat, as the most important factor in its production. (Among these may be found Dickson, Lind, Simons, Jones, Lefort, Poissonnier and Laroche.)

At Tampico the rains commence in July. This is followed by intense heat. It is at this period that yellow fever always occurs. (Webster, p. 75.)

In tropical regions the sickly or fever season corresponds with that of the rains. (Becquerel, p. 124.)

In Rio Janeiro it was observed by Dr. Caudido that the force of the epidemic was greatest in those months in which humidity was most prevalent and marked. At Puerto Cabello, Dr. Lecomb states, "it was a constant and general rule that the place became entirely free from disease, and the healthiest in the world when strong heat, combined with total absence of rain and dampness, prevailed, the atmosphere then becoming entirely dry." (2 Laroche, p. 13.)

The epidemic in Savannah in 1820 arose and prevailed during extreme moisture of the atmosphere and intense heat long continued. (Waring and Daniell.)

Dr. Dickson informs us that in Charleston the yellow fever is more frequent in very wet than in dry seasons.

The epidemic of 1795 prevailed in New York during a season of extreme dampness and sultriness. (Dr. Bailey, pp. 52 and 153.)

The meteorological elements prevailing in Savannah in 1854 are given in the following table, from Dr. Posey :

	At Beginning.	*At Acme.*	*At Decline.*
Temperature.....	79.44	84.14	68.60
Dew Point.....	71.78	79.44	64.91
Humidity	.810	.729	.855
Drying Power.....	7.79	4.70	3.08
Rainfall	Heavy.	7.457	Not given.

Dr. Arnold says of 1854: "The summer had been the very hottest I had ever experienced." (Bilious and Yellow Fever, p. 8.

In New Orleans, in 1853, when the mortality from yellow fever numbered 8,093, the meteorological conditions are given as follows by Dr. Barton :

Months.	*Mortality by Yellow Fever.*	*Mean Temperature in Shade.*	*Rainfall.*	*Dew Point.*	*Drying Power.*
July	1,409	79.88	11.708	72.13	6.21
August.....	5,362	81.25	7.016	78.08	4.52
September ...	1,132	76.23	5.045	70.93	4.84

In the last epidemic, occurring in that city in 1878, the meteorological conditions are thus reported in Report of Board of Health for that year:

Months.	*Mortality by Yellow Fever.*	*Mean Temperature.*	*Rainfall.*	*Humidity.*
June	....	81.95	7.12	71.0
July	26	83.83	5.26	71.0
August.....	1,025	83.59	4.90	71.6
September ...	1,780	78.75	2.67	70.4
October	1,065	71.42	5.07	69.5
November.....	147	59.46	7.78	68.8

In Charleston the fever appeared several years successively, generally making its first attack within a fortnight after heavy rains, succeeded by hot weather. * * * * "These conditions were so frequently repeated, that when a condition of the atmosphere of that kind prevailed, the appearance of the fever was predicted and always followed." (Johnson, Charleston Journal 4th, pp. 154–'6.) In 1852 the quantity of rain that fell in July amounted to 6.95; August, 4.21; September, 12.27. In the year 1849, in July, 6.35; August, 5.16; September, 6.27. In these years the disease prevailed extensively.

Although there are instances recorded when the fever has prevailed after a long heated term, without any extra amount of rainfall, it is evident that the focus of infection, in every epidemic North or South here recorded, has always been in a low, damp and filthy locality—never where the *soil* was dry and the locality healthy.

"The Island of St. Helena, which stands in the yellow fever zone, and which has been used as a port of refuge for infected ships for three-quarters of a century, has never been infected." Why? "An almost bare rock, with but little or no debris, thoroughly washed by every downfall of rain, where yellow fever was and still is found to be non-communicable, where it has never been introduced. (A. N. Bell, *Sanitarian*, December, 1888, p. 503.)

I have examined a large amount of information furnished by the writings of physicians who practiced in the different cities of this country during yellow fever epidemics, and I find not one single fact to contravene the general tenor of the evidence which I submit above: That wherever an epidemic of yellow fever has prevailed in any city, there have existed at the same time a great moisture of the soil and air, and excessive and long continued heat and generally filthy streets and surroundings. So unvarying has been this coincidence that we are forced to the conclusion that without the concurrence of all these terrene and atmospheric conditions the disease cannot be propagated.

This point is emphasized by the fact, also shown by this evidence, that even in an infected city, those places which present these unsanitary conditions in the greatest degree are generally the points of origin of the epidemics, always the seat of its greatest virulence, and sometimes the place to which it is confined.

In this view of the case, it is unnecessary to discuss the question whether the yellow fever germ is indigenous or exotic—contagious it cannot be. A city must be in a condition ready, as it were, for an explosion, and it makes no difference whether the spark that sets it off comes from within or from without. I can find no recorded instance, and have none in my own experience, where the introduction of persons suffering from yellow fever has started an epidemic in a clean place properly drained. On the contrary, medical literature teems with instances where infected persons, with their baggage, have been carried to such places and the disease has died out with the original patient, or been confined to one or two persons who had breathed the *infected air* contained in their trunks. A most striking example of this is presented in the removal of 291 persons last fall from Jackson-

ville, Fla., to Hendersonville, N. C., in a train of cars which went through under strict guard. According to the official report of Dr. Guiteras, five cases developed on the train and five on the first day after arrival in Hendersonville. All the refugees were cordially received by the inhabitants of the place, and distributed among them at their homes, but not one case occurred among the residents, and none among the refugees.

Dr. A. N. Bell, in *Sanitarian*, December, 1888, p. 499: "Now we can understand why it is that quarantine has seemed sometimes to protect and at other times to fail. QUARANTINE PURE AND SIMPLE HAS NEVER PROTECTED. When it has seemed to do so, it was because the place *was not* in a condition to receive the infection."

This brings me to the subject of this paper: "The Rational Method of Preventing Yellow Fever Epidemics." By draining the soil of our cities and their environs and keeping them clean, we will prevent yellow fever!

The stern cold logic of facts points unerringly to the conclusion, that this disease in our country is always caused by persistent municipal disregard of cardinal and long-known hygienic principles. Northern cities, formerly as much subject to yellow fever epidemics as those in our own Southern country, learned this lesson long ago, and have put it into practice, with the result of placing themselves beyond its reach.

The people of Boston, in 1799, elected a Board of Health to cleanse the city and remove nuisances, and, to the credit of that Board be it said, that they not only performed that duty well, but went farther. Under the guidance of the medical fraternity, and with the help of the authorities, they drained the then small city, and, through their instigations, the low, marshy lands surrounding it were reclaimed, and soon became cultivated in truck farms, in gardens and nurseries, which required a constant and careful drainage in order to make them productive. A system of sewers was next established; which, in the course of time, became one of the best in the country. The most approved methods of disposing of the garbage and night-soil were instituted, and after a few years' trial, the citizens became so confident of their immunity from epidemics, that they were content to remove from their quarantine regulations the feature of detention, and, since the early part of this century, the natural course of commerce has not been impeded by such practice. The result was

that their port became, at that early date, the most important on our coast, and remained so until New York, after the severe epidemic of 1822 (under strict quarantine), determined to follow their example, and by the power of an efficient Board of Health, not only removed the existing nuisances along the wharves, slips and narrow streets, but established a system of drainage within and without its limits, removed the garbage, offal and night soil under well-regulated supervision, established abattoirs and removed soap and other noisome factories. When satisfied that their city had been placed in a safe condition, they also removed the feature of detention from their quarantine. Ever since 1858 vessels, after inspection are allowed free pratique, if in a sanitary condition, and, if foul, they are cleaned with as little delay and as small expense as improved machinery will compass, the detention rarely exceeding forty-eight hours. Thus has New York, by prompt and efficient methods, maintained her commercial relations with the world and made herself the metropolis of this continent. Notwithstanding that her quarantine no longer means detention, she has prevented the recurrence of epidemics of yellow fever within her precincts, although the disease is brought there by ships, crews and passengers every year, and has repeatedly broken out in the neighborhood of her quarantine station on Governor's Island, in the localities not properly drained.

At Baltimore, as early as 1819, the medical fraternity, recognizing the non-contagiousness of yellow fever, suggested the modification of the quarantine regulations, which was carried into effect—"allowing the privilege of free communication with the city to passengers and crews of infected vessels." The neighborhood of Fell's Point, where former epidemics had made their habitat, having been drained, Baltimore has never been infected since. Health Commissioner and Registrar James A. Stinart writes me in 1886: "Quarantine of long detention is simply folly and is not practiced at the port of Baltimore."

In Philadelphia, although the local causes producing yellow fever epidemics had been pointed out by the medical men and sanitarians at an early date, it was in this great centre of learning that the contest between "Contagionists" and "Non-Contagionists" raged the fiercest. On account of this very division among medical men, no special attention was given by the authorities to radical sanitary measures. Quarantine regulations were, however, kept up with a certain degree of rigor, but the city remained liable to the incursions of yellow fever. After the epidemic of 1853, however, its hygiene was greatly improved. The sewerage and drainage were thoroughly

and carefully remodeled. The docks and wharves were rebuilt and cleansed, the low streets and alleys were well policed. Since that date yellow fever has never been able to get a foothold. In a letter to me, in March, 1886, Dr. H. Leffmann, the Port Physician, says: "At the Philadelphia quarantine, detention is rare, and it is not usually prolonged. Last year, vessels coming from cholera infected ports were detained forty-eight hours and disinfected. I favor the plan which proposes immediate disinfection of vessels, without delay at quarantine.

From a letter received March 2d, 1879, from Dr. R. Lebby, it appears that Charleston, S. C., furnishes a like experience. He says: "For ten years past, I have been the health officer of this port, and a part of the time Registrar of the City, having had ample opportunity of observing the origin and course of yellow fever, and I am prepared to assert that with a clean city, rigid sanitary regulations carried out and a careful enforcement of our quarantine laws, yellow fever can have no lodgement in this city. But without the most rigid enforcement of the sanitary regulations and the allowance of sweltering masses of vegetable and animal putrefaction to remain, the quarantine, however rigidly enforced, will not afford protection to an atmosphere filled with deleterious gases during the high temperature of July and autumnal months. From 1849 to 1859, a period of ten years, the quarantine was carefully enforced, but the sanitary condition was not satisfactory, drainage was defective, privy vaults were bad and there were no sewers of sufficient capacity to relieve the soil of that excess of moisture which necessarily existed from such defects. During these ten years we had five epidemics of yellow fever and 2,003 deaths. Review the past ten years, from 1868 to 1878, when the present regulations were in action, there has been but one occurrence of yellow fever, in 1871—which could not be traced to importation —with a mortality of 250, and in 1876 two cases of persons from Savannah. In the last instance it did not spread, but terminated where it originated. You can draw the comparison of the twenty years, and see the advantage of rigid sanitary regulations within a city and enforcement of quarantine without it."

It may be stated here, also, that the suburbs of Charleston have been transformed into well-drained truck and strawberry farms, which have greatly improved the healthfulness of these localities.

In Savannah, we have already seen the dreadful effects of undrained, marshy lands upon its population in the early part of this century. In later years, when the limits were extended southward,

the influence of the defective drainage of these same low lands on the eastern and western flanks, was constantly felt by the inhabitants of the new sections. With the month of May appeared the intermittent fevers everywhere, and in July and August severe cases of bilious and congestive fevers were very numerous, bringing the general mortality among the whites in the thirties per thousand. The effect of the saturation of the surrounding undrained soil, in depriving the city of natural advantages, which its high position gives the porous soil, of relieving itself of water by percolation, is plainly seen in all our epidemics. The years 1854 and 1876 were marked, as we have already seen for 1820, by heavy rains. In 1876 eighteen inches fell in ten rainy days in the month of June. The neglect of the authorities had allowed the drains to fall into disuse and permitted stagnation of water within and without the limits. This, together with the filthy condition of the privies, yards, streets and premises on the outskirts, and the intense heat prevailing, placed the whole city in a condition to allow the spread of the disease in every corner. After this great epidemic the State Board of Health, then in existence, paid a visit to the city and, on viewing its surroundings, recommended drainage. Through their instrumentality, and the liberality of the Legislature, a system of drainage was started. This has since been extended outside of the city limits by the County Commissioners, using the convict labor of the county for the purpose, and has been attended with most beneficial results. Malarial fevers have almost disappeared, and the mortality from all causes was reduced to thirteen per thousand among the whites for the past year. The drainage is not yet, however, so perfect as to prevent the saturation of the soil in the low lands after heavy rains, and so it is that we are still in danger of an epidemic whenever such a saturation is followed by intense heat during the summer months, especially if the existing drains be neglected, for, be it remembered that prior to 1876 the city had prevented the wet culture of rice within one mile of the limits, and had established drains through the low lands, which measures had reduced the mortality to below twenty per one thousand among the white population, and it was the neglect to keep the drains open and in good working order that permitted the saturation of the soil and precipitated the calamity of that year.

St. Augustine, so much exposed and *so near the source of infection*, has had but three epidemics of yellow fever from its origin in 1565 to this date. The disease never originated in the city proper, but always in the low, filthy suburbs, near the water's edge. Why this exemption? It is built on a narrow, duck-back, shell bluff. Its

streets are frequently washed by tropical rains. It is thus kept clean by natural forces.

Mr. President, no part of this great continent is more favored by nature than the Southern States bordering upon the Atlantic and the Gulf of Mexico. With a sun almost tropical, a soil unsurpassed in fertility, they can produce almost everything that is required for the uses of mankind. They clothe the world with their cotton, they could feed it with their corn; they could raise all the sugar and rice that is required in this hemisphere; their immense forests furnish enough timber and naval stores to build all the ships in the world; their noble rivers furnish cheap and easy transportation to the sea for all their products, and on their coasts are sites for building cities as magnificent as any history tells of. Yet why have these cities not been built? Why have those attempted either died out or lingered in their growth? Why is it that these States are not dotted with the large towns and villages to be found in the Northern States possessing not one-half of their natural advantages? IT IS because the vast lakes, lagoons and swamps which cover the land breed a pestilence and furnish the atmosphere in which yellow fever is propagated! It is because their low lands are so soaked with the water that descends upon them from the clouds and flows upon them from the high country, that whenever their rich alluvium is opened for cultivation, or their trees felled to found a city, malarial fevers spring up and kill the new population, or so enervate those who are spared that they find themselves unable to carry on their plans with vigor and enterprise.

How is this condition to be changed? How is this rich country to be made habitable and healthy for those who are to develope the vast wealth which nature has so lavishly bestowed?

Mr. President, I believe that this country can be converted into the garden spot of the Atlantic slope; that this climate can be made as healthy as any on the globe. I believe that these States can be made the home of as thrifty a population as any North or West.

How are swamps, morasses, etc., fit now only for the home of the bull frog, the alligator, the wild beasts and birds, to be converted into soil adapted to the uses and habitation of civilized men? How are death dealing gases to be dispelled and pure fresh air substituted? I answer, BY DRAINAGE, AND ONLY DRAINAGE CAN ACCOMPLISH IT. Canals must be cut to carry off the water and dry the land. Rivers must be confined within their banks. It is truly a vast undertaking to drain hundreds of thousands of square miles of

lands subject to inundations from the mountains and to almost tropical rains. But, it can be accomplished if the labor be systematically undertaken by the several States interested, and the share of each distributed equitably among its own population, the task will not be such a stupendous one as would appear at first sight. Private enterprise has already done much toward reclaiming wet and swampy lands in Forida and other Southern States, but private enterprise cannot, unaided, accomplish a work of such magnitude. To insure success the States must use their legislative power to assist those willing to drain, and to compel those who are not willing. Boards of Health must be established having drainage for their primary object.

I have devoted much time to studying the requirements of a Board of Health for Georgia, and have formulated my views in a bill, which I present for the approval of this Association.

It provides for the establishment of a Sanitary Board in each county, which shall have control of all matters affecting the public health within its own jurisdiction. By this means the people of every portion of the State will be made aware of their own peculiar requirements, and enabled, understandingly, to remove all nuisances affecting the health of the community at their own expense. A State Board, composed of a Chief Commissioner of Health, one Commissioner from each Congressional District and five commercial men, representing the most important commercial centers of the State, to have general supervision and control over all the County Boards, and have full power to enforce all sanitary measures necessary to prevent the spread of epidemics within the State It proposes that the physicians in the State Board shall be commissioned by the Governor on the recommendation of the censors of this Association.

Mr. President, in preparing this bill, I am not actuated by any personal ambition, nor by any desire that the portion of the State in which I live shall acquire any undue prominence, but by the single wish to accomplish something for the good of this great commonwealth. I have long been satisfied that an *active* and *efficient* Board of Health is absolutely required, if Georgia is to take the place in this great Republic to which her natural resources and geographical position entitles her. An attempt was made some years ago to provide her with a Board of Health. An Act was passed and a Board created. That law still stands upon our statute books, and the Board still exists on PAPER. But what has it accomplished? Nothing. It was not adapted to our purpose. It had no power, not even power to interfere with local authorities. It had no organization to fit it for the accom-

plishment of any useful end. I have tried to devise one better suited to the needs of our State, which I have submitted to the committee you have appointed to consider the subject, in the hope that it will be adopted by this body. Whatever may be your action in this matter, let me impress upon you that a great responsibility, perhaps the weal or woe of Georgia for many years to come, rests upon this Association.

The people look to the medical men for advice in all matters affecting their health, and if the physicians tell them that the public health requires the institution of certain measures, they will demand that the Legislature enact a law to carry the recommendation into effect. Composed as this body is of physicians from every part of the State, each having an influence among his neighbors and in his own community, it can wield a power greater than anyone of us can realize. Will you not use that power to give to the State a Board of Health calculated to increase its prosperity?

Great as is the influence of health and disease upon the prosperity of a State, and strenuous as should be our efforts to attain as high a standard of health as possible, it behooves us as citizens to have a careful regard for all the interests which go to make up that prosperity, and in the selection of sanitary measures to choose those which will interfere as little as possible with commerce, agriculture and other industrial pursuits of the people. Commerce, especially, should be hampered with but few restrictions. In these days of rapid transportation the State whose commerce is liable to obstruction will be left far behind in the race with those whose channels of trade are always free and open.

Time was when Georgia was an *Imperium in imperio*, when she had in her own cities stores to supply the wants of her agriculturalists, when her ports were open the year round, and she could replenish her stock from all parts of the world at her own will. At that time there were no great trunk lines of railway; there were no Goulds and Vanderbilts. Steam navigation was in its infancy. There were neither futures nor corners—no trusts to concentrate the profits of trade in great cities. Each port and city was the market of supplies for the adjacent country, and was secure in a trade that none could take from her.

Yellow fever was not then paraded as a contagious disease. Like epidemic malarial fever, it was expected to recur. It was feared at the North as much as at the South, because both sections were equally liable to its visitations. No one dreamt of its being confined to any

particular part of the country, but each city was left to rid herself from it as best she could.

That time is now past. The wealth and power of the nation have, through the results of war, been concentrated in the Northern States, and we must now struggle to relieve Georgia from that condition of commercial vassalage into which it has been plunged, and in which it is the interest of the North to keep us. We must carefully inquire whether it was with justice that the Northern papers for the last twenty years have been branding the South as a standing menace to the health of the whole country, her seaports as the gateways through which pestilence was introduced, and in declaring that patriotism required the closing of those ports during six months of the year, or whether these declarations were not the result of a deep-laid scheme, and if we have not fallen into a trap cunningly set for us.

Gentlemen, ever since the epidemic of 1876, when yellow fever was dubbed contagious and the deadliest disease in the world, we have, by our own action and through the efforts of our own representatives, in deference to public opinion, virtually closed our ports from May 1 to November.

Has this great sacrifice prevented the recurrence of yellow fever? No. In 1877 Florida had a visitation of the disease on its coast. In 1878 the epidemic spread along a great portion of the Mississippi valley. Memphis and the surrounding valley had it in 1879. Key West had an epidemic in 1880. In 1882, while the National Board of Health had its inspectors along our coast, yellow fever occurred in Brownsville and along the Rio Grande. In 1884 Brewton, Ala., was infected. In 1886 Biloxi, Miss., suffered. In 1887 it appeared at Key West, and sporadic cases occurred in Tampa, Manatee and Plant City, culminating in the epidemic of 1888 in Jacksonville and other places in Florida.

While then this policy of strict quarantine has been barren of good results in keeping yellow fever out of the country, what has been its effects upon our commerce? Look at our seaports: Savannah, the greatest of them, with an export business of $100,000,000 a year, has scarcely any imports—has no great warehouses from which to supply the people at her very doors. She is nothing but a way-station between the agriculturists of the State and foreign consumers. Darien and Brunswick are in a still worse condition. Who has gained by our loss? The great cities of the North have stretched out their iron arms into our State, and have taken unto themselves that profit from traffic

with our people which should supply life and prosperity to our own seaports.

Mr. President, one would think that this victory, and the immense profits derived from the diversion of our maritime commerce, ought to satisfy the greed of the great commercial centres But it is not so. They want still more. They see with a jealous eye that industries are springing up in the interior of our States which must greatly interfere with their own. They want to retain to themselves all the trade of the Southern people. They feel that nothing can accomplish this result unless they can break up our inter-State commerce. The success which they have attained by the agitation of maritime quarantine *as the only means of preventing yellow fever*, has encouraged them to promulgate the doctrine that internal quarantine is also necessary. They say that in spite of the utmost care to guard the coasts from invasion, cases of yellow fever will creep in, and that the only way to prevent an epidemic is to quarantine against the coast towns. They say that State power is inadequate to make an effectual quarantine, and that the Federal power must be invoked.

The Marine Hospital Service has been supplied with money and invested with power to institute and manage internal quarantine whenever called on by the authorities of any State to do so.

At different times several of our States have invoked this Federal aid, under the belief, forced upon them through every channel of the press, that safety from yellow fever infection would be insured by isolation of cases; disinfection of houses and of cities to stamp it out; the shutting up of the inhabitants in an infected city and in camps; punching and fumigation of the mails; the quarantine of healthy towns against the whole infected country, and, finally, such restrictions upon travel and commerce as will effectually prevent intercourse between the States in the so-called fever zone.

We will now proceed to inquire whether this plan has ever succeeded in stamping out an epidemic of yellow fever when once established, or has changed its historical habit of spreading to all places in a condition to propagate it. The first methodical application of the plan on an extended scale was in 1882 at Brownsville, Texas. Here signal success is claimed in confining the disease within the cordon, but it must be remarked that it extended for a considerable distance along the river and affected a number of places—Brownsville, Point Isabel, Raynosa, Camargo, Gerrara, Santa Maria—all in condition, which we have observed, to be always the accompaniment of yellow

fever epidemics. So that perhaps after all the disease would not have spread further than it did even without the cordon. Be that as it may, the apparent success here met with caused the same means to be employed in Florida last year. Immediately upon the appearance of the disease in Jacksonville every means that has been recommended to stamp it out was brought into use. Isolation of cases, disinfection, and even the burning of houses was practiced. When, in spite of all this, it became epidemic, the Maritime Hospital Service was called in, a cordon was established around the city, and the people were confined in a death-trap. If they escaped, they were hounded down on every road as criminals; if captured, they were put into pest-houses or on the chain-gang. Every city closed its doors against them. The mails were fumigated, commerce was completely cut off, and every effort was made to surround the infected city with an impassable wall. Yet notwithstanding all these precautions, the disease did appear and become epidemic in other towns and villages. Fernandina, Gainesville, Enterprise, Maclenny, etc., were all infected. Were no efforts made at these places to control the disease? There were. But, wet, filthy and undrained, they presented conditions favorable for its spread, and it did spread. A case was carried to Callahan, Fla.; one to Blackshear, Ga., one to Uptonville, Ga., but here it did not spread. It is claimed that isolation prevented its spread, but these places were clean, dry and healthy.

Again, it appeared in Jackson, Miss. There, it is said, it was not imported. "We see the disease breaking out afresh, *after a long period of hibernation*." (J. B. Hamilton, *North American Review*, January, 1889, p. 57.) The people there believed that it was due to the upturning of the soil.

Decatur, Ala., where little attention was paid to sanitation, had its epidemic, and Dr. Hamilton says it must have originated from the baggage of a person from an infected city left in the house of Mr. Spencer! (*Ibid.*)

Does it not appear from all this that internal quarantine is as futile as maritime, to arrest the spread of yellow fever? Does it not seem that, cordon or no cordon, it affects all places within its influence which are in a condition to propagate it, and spares those which are dry and healthy?

There is nothing in the history of yellow fever which would lead any scientific man, *familiar with it from practice*, to believe that it is

contagious, or that its spread could be prevented by quarantine, maritime or internal.

All the scientific research of the past quarter of a century has failed to discover the immediate palpable cause of yellow fever. The germ is as much an enigma as it ever was, and, although the microbe has been pictured again and again by enthusiastic microscopists, we have not advanced one step beyond where we were in 1860.

But, are we without the means of prevention? The physicians who have recorded the conditions attending yellow fever epidemics, have spent their time and labor in vain, if they have not proven that yellow fever is a preventable disease, and that the means for its prevention are easily within our reach. *Drainage and cleanliness* have been recognized from far back in the study of medical science as the fundamental principle in the prevention of all diseases. Experience has proven that these two measures by themselves will prevent yellow fever. Drainage and cleanliness can surely be effectually enforced throughout Georgia by a State Board of Health, if we give to that Board the power which many think we should confer on the General Government. And I now ask of you: Will you entrust this important task in the hands of the General Government, or to Georgians, true to their manhood and to their own State?